A Note on the Geology of the Albatross Point District, Kawhia.

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Abstract.

Molluscan and plant fossils collected from Albatross Point, Kawhia, indicate that the Mesozoic rocks of the area, previously regarded as Triassic, are not older than mid-Jurassic. The presence of a major fault is suggested to explain the absence, west of Arawi Point, of 10,000 feet of Upper Triassic and Lower Jurassic strata.

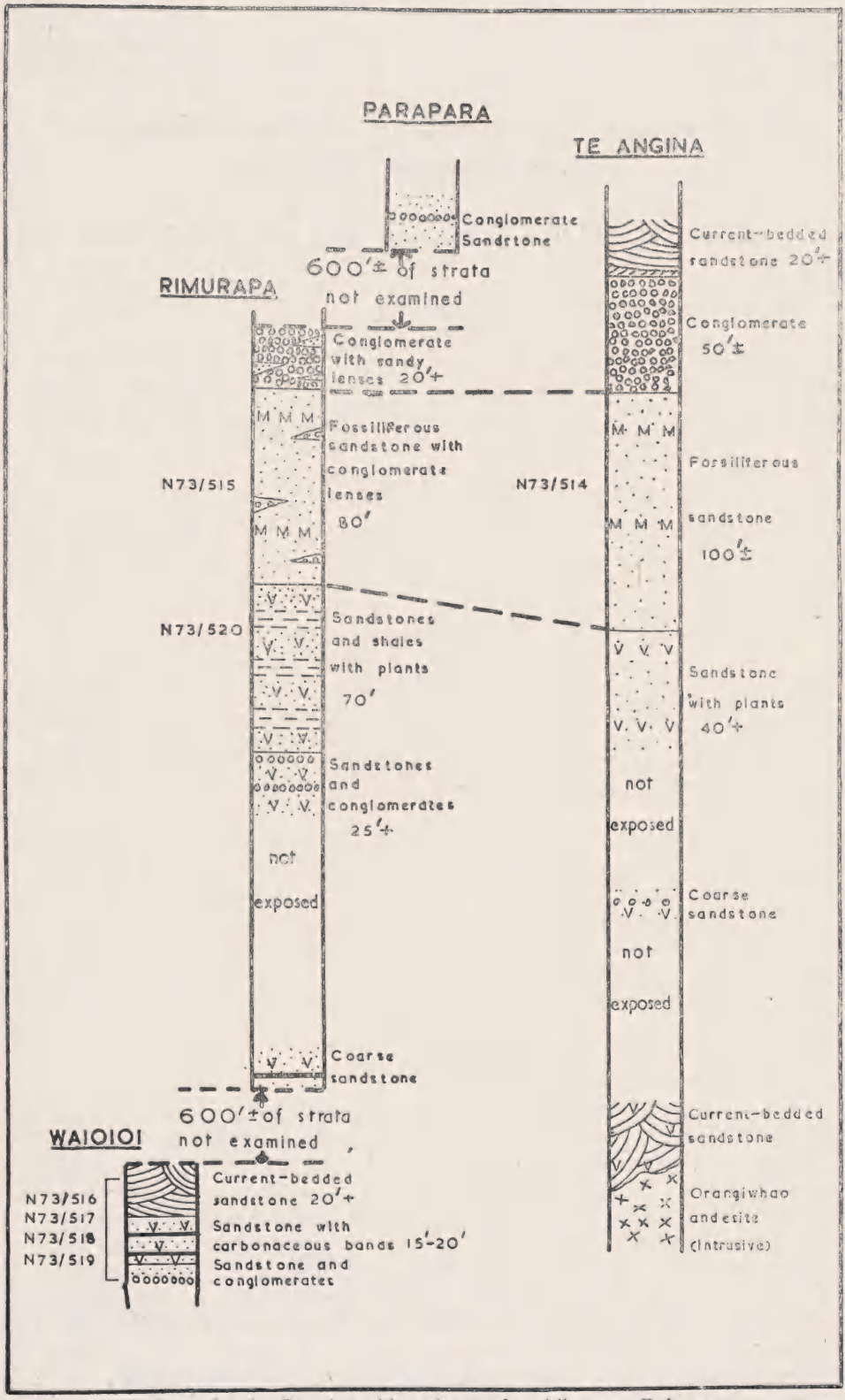
INTRODUCTION.

As the Kawhia section provides one of the most nearly complete sequences of Triassic and Jurassic rocks in New Zealand it has received considerable attention in geological literature. However, Albatross Point, on the outer coast of the harbour, has been strangely neglected in most accounts, evidently because of its isolated situation. McKay (1884) did not examine the rocks at Albatross Point, but noted the westerly dip of the beds on the west side of the Orangiwhao andesite intrusion and considered that they belonged to the Wairoa or a younger series. Henderson and Grange (1926) failed to collect fossils west of Arawi Point, but as the beds closely resembled the Upper Triassic beds further east they were correlated with them.

In January, 1950, the writer had the opportunity of spending several days in the Albatross Point area and this account is based on observations made during that visit. The outer coast is extremely rugged and it was not found possible to examine the section at Albatross Point itself nor that between Rimurapa and Waioioi. Thus, although the total thickness of beds exposed in the area is approximately 1,800 feet, 1,200 feet of these were not examined.

STRUCTURE.

The regional structure, from the Orangiwhao andesite mass, west of Arawi Point, to the outer coast, is an assymetric syncline which plunges in a direction a few degrees west of south. On the west wing of the syncline the beds strike consistently at about 340° and dip to the east at 40°. This structure is given surface expression in the trends of the outer and inner coasts and in the fine example of a dip slope on the inner side of the point. On the east wing, however, the disposition of the beds is less consistent, due to the influence of the Orangiwhao andesite intrusion, and it is probable that the westerly dip of the beds is largely due to the upward movement of the intrusion. The geological map of Albatross Survey District (Henderson and Grange, 1926) shows two faults between Parapara and Te Angina to explain this irregularity



Text fig. 1. Stratigraphic columns for Albatross Point area.

in disposition of the beds. The succession contains several distinctive beds (massive conglomerates and fossiliferous sandstones) which allow correlation of the two arms of the syncline.

STRATIGRAPHY.

The entire sequence is obviously of shallow-water origin, with thick bands of coarse conglomerate, current-bedded sandstones, and abundant plant remains (Text-fig. 1). The lowest beds seen were those exposed in the coastal section from 15 to 50 chains south-south-east of Waioioi. The coast is here a strike coast, so that no great thickness of strata was observed. The lowest bed is a gritty sandstone with conglomerate lenses which is succeeded by 15 or 20 feet of alternating sandstones and carbonaceous bands with indistinct plant remains and fragments of wood up to 2 feet in length. There then follows a massive, current-bedded sandstone at least 20 feet thick (upper limit not observed).

The inaccessible nature of the coast prevented examination of the 500 or 600 feet of strata exposed between Waioioi and Rimurapa. At Rimurapa, a hard, coarse, gritty sandstone is overlain by 3 feet of coarse, soft sandstone that contains wood fragments and occasional plant remains. This is followed by alternating sandstone and carbonaceous bands, and there is then a gap in the sequence of approximately 100 feet due to lack of exposures. The next beds seen are sandstones, grits, and conglomerates (at least 25 feet thick) with fragments of wood up to 3 feet in length. Following this are 70 feet of alternating sandstones and shales, in bands 1 foot to 2 feet thick, with well-preserved plant remains. Next is a massive sandstone (80 feet) containing lenses of fine conglomerate and layers very rich in *Gervillea* n. sp. This is overlain at a sharp contact by at least 20 feet of conglomerate (upper limit not seen) with lenses of sandstone. The pebbles in this conglomerate have a maximum length of 6 inches.

Precipitous cliffs prevented examination of the succeeding 600 feet of strata and the next beds seen were the gritty sandstones exposed along the strike coast on the inner side of the point. At Parapara, these are overlain by 6 feet of coarse conglomerate (pebbles up to 3 inches long), which in turn are followed by shattered sandstone—the highest bed seen in the area.

The section on the eastern arm of the syncline, between Parapara and Tokatapu, is similar to that at Rimurapa. The massive conglomerate, which was the highest bed seen at Rimurapa, is exposed on the west side of Te Angina. It is approximately 50 feet thick and is succeeded by alternating bands, 2 to 3 inches deep, of coarse and fine cross-bedded sandstone. The lowest bed exposed is a coarse, cross-bedded sandstone with carbonaceous bands and rare wood fragments. It rests directly on the Orangiwhao andesite mass, about 300 yards south-east of Tokatapu. Isolated outcrops of sedimentary rock occur further east involved with the andesite, but their stratigraphic position is uncertain.

Marine fossils were collected from the massive sandstone at Rimurapa and from its equivalent east of Te Angina, whilst well-preserved

plants occur in the underlying sandstones and shales. Fossils were also found in beach boulders south of Waioioi. The writer is indebted to Dr. J. Marwick and Mr. R. McQueen for the following identifications:

Sheet Fossil Number	N73/514	N73/515	N73/516	N73/517	N73/518	N73/519	N73/520
Gervillea n. sp.	×	×					
Meleagrinella sp.		×	×				
?*Astarte* sp.			×				
?*Tancredia* sp.			×	×			
Cladophlebis denticulata (Brong.)					×	×	×
Elatocladus sp.						×	
Taeniopteris spatulata McClelland					×		
Cladophlebis australis (Morris)							×

N73/514.—East side of Te Angina (Grid reference 234068).

N73/515 and N73/520.—10 chains east-north-east of Rimurapa (217077).

N73/516.—Beach boulders 40 chains south-south-east of Waioioi (219055).

N73/517 and N73/518.—Beach boulders 15 chains south-south-east of Waioioi (217062).

N73/519.—Beach boulder 20 chains south-south-east of Waioioi (218057).

The stratigraphic positions of the fossils are indicated in the columnar sections in Text-fig. 1. Collectively, they indicate a Middle or Upper Jurassic age for the Albatross Point beds. Correlation of the pelecypod fauna with those of other parts of New Zealand suggests that the beds belong to the Temaikan stage, but present knowledge of New Zealand's Mesozoic flora is too incomplete to allow close correlation of the plant beds.*

DISCUSSION.

The discovery that the rocks of the Albatross Point Block are Jurassic in age is rather surprising, for at Arawi Point, 1 mile to the east and on the opposite side of the Orangiwhao andesite intrusion, Otamitan (*Mytilus problematicus*) beds occur at the base of the western arm of the Kawhia syncline. East of Arawi Point, successively younger beds, dipping consistently eastward, outcrop in regular succession for a distance of 7 or 8 miles. Between the Otamitan (Carnian) beds at Arawi Point and the Temaikan (Bajocian-Bathonian) beds at Te Maika (with which the Albatross Point beds may be correlated) are approximately 10,000 feet of strata which are not represented west of Arawi Point.

The Albatross Point Block is nowhere in contact with the main mass of the Kawhia Mesozoic succession and it is therefore difficult to interpret the relation between the two. However, it appears highly probable that the area west of Arawi Point has been down-faulted in relation to the country further east. South of Kawhia Harbour, the coastal area between Tongaporutu and Marakopa is characterised by

* Private communications.

a series of *en echelon* faults which trend a few degrees east of north (Henderson and Ongley, 1923; Marwick, 1946). These constitute the great fracture zone that separates the Herangi Range from the narrow, depressed coastal strip on its western margin. The northernmost fault (Whakahau Fault) reaches the coast near Marakopa, and north of this point the depressed coastal strip passes beneath sea level. However, it is reasonably certain that the fracture zone (and the Whakahau Fault) continues north of Marakopa, and it is here suggested that the Albatross Point Block is a northern remnant of the depressed coastal strip of Te Kuiti Subdivision. In Whareorino Survey District are two andesite masses, Pehimatea and Whareorino*, which are closely similar to that of Orangiwhao (Henderson and Grange, 1926, p. 66; Williamson, 1932, p. 8). Both Pehimatea and Whareorino occur along the surface trace of the Whakahau Fault, and as similar rocks do not occur elsewhere in Huntly-Kawhia or Te Kuiti Subdivisions, it seems more than coincidence that the Orangiwhao mass should occur on the northward continuation of the same line.

An alternative hypothesis which should, perhaps, be considered is the possibility of an unconformity in the Mesozoic succession east of Arawi Point. The palaeontological evidence, which, however, is incomplete, shows no sign of a break, but the sudden decrease in dip (from 75° to 40°) in the vicinity of the conglomerate band, half a mile northeast of Arataura,, which marks the base of the Jurassic, may possibly indicate an angular unconformity. It is unfortunate that no detailed survey, comparable in scope to those made by recent workers in Southland, is available for the Kawhia section to allow discussion of this suggestion.

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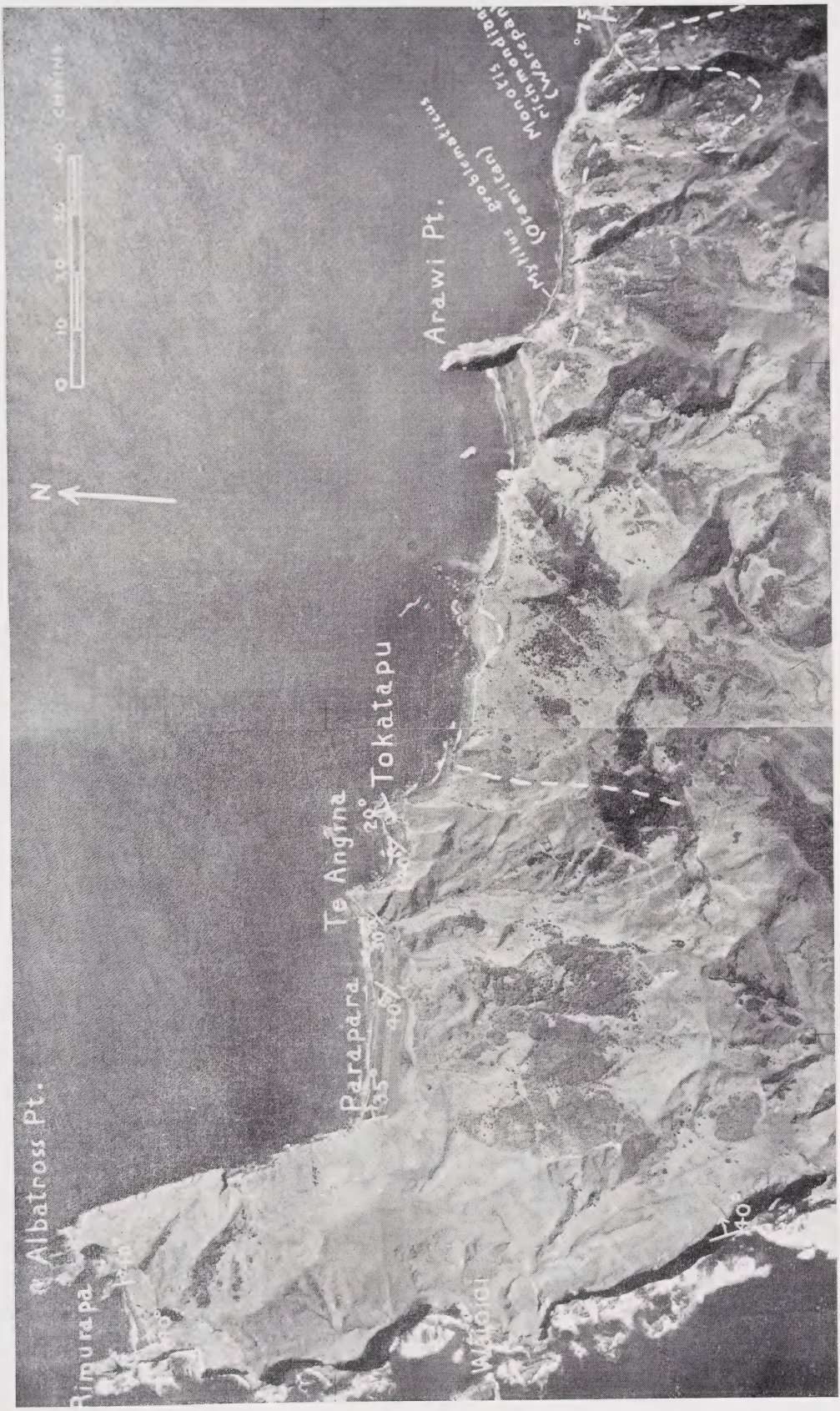
* Hutton (1944, p. 151) classifies the rocks of Pehimatea and Whareorino as dacites.



Aerial photograph of the Albatross Point district, Kawhia. The dotted line indicates the approximate boundary of the Orangiwhao andesite mass.

(Photograph published by permission of the Lands and Survey Department.)